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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/663,023

09/15/2003

Bookeun Oh

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EXAMINER

ECHELMEYER, ALIX ELIZABETH

ART UNIT

PAPER NUMBER

1745

MAIL DATE

DELIVERY MODE

09/21/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/663,023

Applicant(s)

OH ET AL.

Examiner

Alix Elizabeth Echelmeyer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,6,8-34,63 and 64 is/are pending in the application.
- 4a) Of the above claim(s) 6 and 8-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,14-34,63,64 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Formula I in the reply filed on July 3, 2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Response to Amendment

2. In the action filed March 28, 2007, Claims 1, 14, 63 and 64 were amended. Claims 3-5 were cancelled. Claims 6 and 8-13 were withdrawn.

3. Currently, claim 1 is amended.

4. Claims 1, 2, 13-34, 63 and 64 are pending and are rejected for the reasons given below.

Claim Objections

5. Claim 19 is objected to because of the following informalities: the term "[EO]/[Li]" is not previously defined in the claims, but is found in the specification at, for example, [0029]. Appropriate correction is required. Please define the term before the abbreviation is used in the claim.

Claim Rejections - 35 USC § 112

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6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. The rejection of claim 19 is withdrawn.

8. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The term "cross-linker" is indefinite. The term has not been clearly defined. It is mentioned in several places, such as in [0079] and [0080], but is not clearly defined in the claims to enable one having ordinary skill in the art to know what is meant by the term.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims 1, 63 and 64 are rejected under 35 U.S.C. 102(e) as being anticipated by Amine et al. (US 2004/0197665).

The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome

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either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Formula 1 of claims 1, 63 and 64 for values of $p=0$ is anticipated by Amine et al. (Figure 1).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 1, 2, 14-19, 20-25 and 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. (US 6,783,397) in view of Miura et al. (US 6,858,351).

Kang et al. teach a cross-linkable solid polymer electrolyte for lithium-polymer secondary batteries (abstract).

Kang et al. teach a cross-linking agent, used to increase the compatibility between a plasticizer, such as a polyalkylene oxide, polymethyl siloxane with alkylene oxides or nonaqueous polar solvent and a lithium salt (column 3 lines 1-67; column 4 lines 1-28 and 31-36).

Kang et al. teach that the plasticizer may be a polyalkylene glycol dialkyl ether, such as polyethylene glycol dimethyl ether (column 8 lines 65-67).

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Examples of the lithium salt include LiClO_4 , LiCF_3SO_3 , LiBF_4 , LiPF_6 , LiAsF_6 , $\text{Li}(\text{CF}_3\text{SO}_2)_2\text{N}$ (column 9 lines 13-18).

Regarding claim 15, Kang et al. teach that a plasticizer with a low molecular weight is added to the polymer electrolyte (column 2 lines 46-54) but fail to disclose the claimed range. It would have been obvious to one having ordinary skill in the art at the time the invention was made to experiment to find the most effective molecular weight, since Kang et al. teach that molecular weight of the plasticizer affects ionic conductivity. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05(II B).

As for claims 16, 17 and 19, Kang et al. teach various ranges for the amounts of each component in the electrolyte (i.e. column 9 lines 13-18), but fail to disclose the exact ranges claimed. It would have been obvious to one having ordinary skill in the art at the time the invention was made to experiment to find the most effective amounts of each component in the electrolyte, since the relative amounts of the components determine the ionic conductivity of the electrolyte (Tables 3-7). It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. MPEP 2144.05(II B).

Kang et al. fail to teach the Formulas of claim 1.

Miura et al. teach Formula VI for values of $p=0$. Miura et al. teach an electrolyte for an electrochemical device (column 1 lines 17-18). The electrolyte of Miura et al.

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includes an organic silicon compound having an ethylene oxide unit (column 1 lines 63-37). The organic silicon may be cyclic (column 7 lines 4-7).

Miura et al. fail to teach the specific structure of the alkoxy side chain claimed and a spacer positioned between the alkoxy side chain and the silicon of the polysiloxane (either cyclic or network).

Miura et al. teach such a side chain and spacer for silicon compounds, see formulas (iv), (v), (vi). This ethylene oxide unit, or the side chain of the instantly claimed invention, prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature (column 8 lines 28-31). Additionally, with regard to claims 4 and 5, the spacer A_{12} or A_{14} includes 0 to 3 $-CH_2-$ groups (column 8 lines 53-54).

It would be within the ordinary level of skill for the art to attach the ethylene oxide unit side chain to the polysiloxane unit, since it is shown by Miura et al. to be a proper side chain and effective as a spacer group, especially since such a side chain prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to attach the ethylene oxide unit side chain to the polysiloxane unit, since such a side chain prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

It would be desirable to use the cyclic polysiloxane of Miura et al. as just discussed in the electrolyte of Kang et al. since it prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the cyclic polysiloxane of Miura et al. in the electrolyte of Kang et al. since it prevents the crystallization of the polymer, decreases the glass transition temperature, and gives excellent ionic conductivity through the amorphous phases that form even at low temperature.

13. Claims 26-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. in view of Miura et al. as applied to claim 25 above, and in further view of Munshi (US Patent 6, 413, 676).

The teachings of Kang et al. and Miura et al. as discussed above are incorporated herein.

Kang et al. in view of Miura et al. fail to teach a polyacrylate or polymethacrylate network polymer.

Munshi teaches polymethacrylate for use in a polymer blend in a solid polymer electrolyte, since this creates a highly stable, resilient electrolyte for use in a lithium battery (abstract; column 11 lines 18-29).

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It would be advantageous to use a polymethacrylate as taught by Munshi in the solid electrolyte of Kang et al. in view of Miura et al. since it creates a highly stable, resilient electrolyte for use in a lithium battery.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a polymethacrylate as taught by Munshi in the solid electrolyte of Kang et al. in view of Miura et al. since it creates a highly stable, resilient electrolyte for use in a lithium battery.

14. Claims 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kang et al. in view of Miura et al. as applied to claim 1, and in further view of Hanson et al. (US Pre-Grant Publication 2001/0001053).

The teachings of Kang et al. and Miura et al. as discussed above are incorporated herein.

Kang et al. in view of Miura et al. teach a lithium battery with the electrolyte of the claimed invention but are silent on the anode and cathode materials. Since the battery is a lithium battery, it inherently would have a lithium-based anode.

Hanson et al. teach a lithium battery having an anode and cathode. Hanson et al. teach that a typical anode for a lithium battery is a lithium material, while a metal oxide such as lithiated vanadium is used for the cathode.

It would be desirable to use the anode and cathode materials of Hanson et al. in the battery of Kang et al. in view of Miura et al. since it is taught by Hanson et al. that

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those materials are typically used to generate electricity and transfer ions in a lithium battery and since Kang et al. does not disclose specific materials for the electrodes.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the anode and cathode materials of Hanson et al. in the battery of Kang et al. in view of Miura et al. since it is taught by Hanson et al. that those materials are typically used for the electrodes and since Kang et al. does not disclose specific materials for the electrodes.

Response to Arguments

15. Applicant's arguments filed July 3, 2007, with respect to the Zhang et al. reference have been fully considered and are persuasive. The rejection of claims 5, 14, 63 and 64 has been withdrawn. A new rejection for the subject matter from those claims is provided above.

Double Patenting

16. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422

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F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

17. Claims 1, 11, 12 and 23 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 30 and 47-49 of copending Application No. 10/663,024. Although the conflicting claims are not identical, they are not patentably distinct from each other because they are not patentably distinct from each other because the claims of the instant application require one or more siloxane polymers, which are disclosed in copending claims 1, 30 and 47-49 in Application 10/663,024. The copending claims anticipate the instant claims.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy N. Tsang-Foster can be reached on 571-272-1293. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

aee


SUSYTSANG-FOSTER
PRIMARY EXAMINER